

(AMENDED) CLAIMS

1. A vacuum suction head comprising:

a suction pad which contacts and sucks in vacuum a sucking surface of an object to be sucked;

5 a shaft which holds said suction pad at one end, and is provided with an air charging and discharging hole for charging gas into and discharging gas from said suction pad;

a casing part which has a cylindrical space for regulating a movable range of said shaft and holding said shaft in a slightly movable manner; and

10 an elastic supporter which elastically supports said shaft in said casing part, in a freely and slightly movable manner in an axial direction of said casing part and in a direction diagonal to the axial direction.

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2. The vacuum suction head according to claim 1, wherein

said shaft has a step which is arranged in a guard shape at a substantially intermediate position in said casing part,

said casing part comprises a cylindrical part which provides a space for holding said elastic supporter in a freely deforming manner in the inner side, a first casing plate which encloses one end of said cylindrical part remaining a first opening, and a second casing plate which encloses the other end of said cylindrical part remaining a second opening, and

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said elastic supporter includes a first spring which is held between said first casing plate and said step, and a second spring which is held between said second casing plate and said step.

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3. The vacuum suction head according to claim 2, wherein said first spring and said second spring are coil springs, and

an aperture-diameter of said first and second openings is
10 larger than an outer diameter of said shaft and smaller than an outer diameter of said first spring and said second spring.

4. The vacuum suction head according to claim 2, wherein said suction pad is arranged on said second opening side,
15 and

a compression force of said first spring is greater than a compression force of said second spring when said suction pad is in a no-load state.

20 5. The vacuum suction head according to claim 1, wherein said suction pad includes a sucking part which uses a plate-shaped member and has a plurality of independent convex parts and concave parts on one surface of the member, an air tight part which is formed into an annular shape at an outer
25 peripheral position of said plate-shaped member surrounding

said sucking part, a groove which acts as a passage for discharging gas of said sucking part, and a vacuum suction disk which has with an opening for externally discharging gas in said groove.

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6. The vacuum suction head according to claim 5, wherein said suction pad provides a skirt pad which is formed so as to surround said vacuum suction disk, and shields outside air from surrounding space of said vacuum suction disk when
10 said vacuum suction disk approaches the object to be sucked up to a predetermined position.

7. The vacuum suction head according to claim 1, wherein said suction pad is composed of a flat resin without
15 asperity.

8. A vacuum suction device comprising a plurality of vacuum suction heads,

each vacuum suction head providing:

20 a suction pad which contacts and sucks in vacuum a sucking surface of an object to be sucked;

a shaft which holds said suction pad at one end, and is provided with an air charging and discharging hole for charging gas into and discharging gas from said suction pad;

25 a casing part which has a cylindrical space for

regulating a movable range of said shaft and holding said shaft in a slightly movable manner; and

an elastic supporter which elastically supports said shaft in said casing part, in a freely and slightly movable
5 manner in an axial direction of said casing part and in a direction diagonal to the axial direction, wherein

said plurality of vacuum suction heads contact and suck in vacuum the surface of the object to be sucked.

10 9. A table comprising a plurality of vacuum suction heads,

each vacuum suction head providing:

a suction pad which contacts and sucks in vacuum a sucking surface of an object to be sucked;

15 a shaft which holds said suction pad at one end, and is provided with an air charging and discharging hole for charging gas into and discharging gas from said suction pad;

a casing part which has a cylindrical space for regulating a movable range of said shaft and holding said
20 shaft in a slightly movable manner; and

an elastic supporter which elastically supports said shaft in said casing part, in a freely and slightly movable manner in an axial direction of said casing part and in a direction diagonal to the axial direction, wherein

25 said vacuum suction heads are arranged on a base plate

with said suction pads facing upward, and

gas is blew from said suction pad to float the object to
be sucked mounted on said suction pad, and gas is discharged
from said suction pad to contact and suck in vacuum the
5 sucking surface of the object to be sucked to said suction pad.

10. The table according to claim 9, further comprising
positioning means for positioning said object to be sucked.